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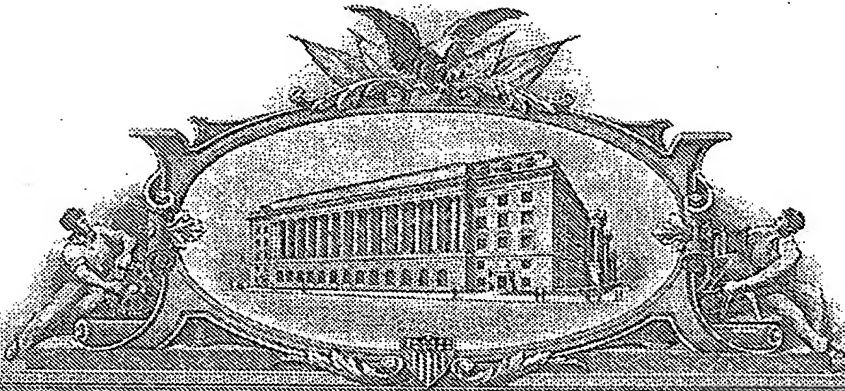
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101404

13281 U.S. PTO

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: John Szaro *et al*

Invention: **POP-UP SPORTS TRAINING ASSEMBLIES,
AND RELATED DEVICES AND METHODS**

**PROVISIONAL PATENT APPLICATION
FILING RECEIPT AND TRANSMITTAL**

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Sir:

In connection with the above-captioned invention, applicant, a small entity, submits herewith:

- 1) A PROVISIONAL Patent Application (a total of 38 pages), including:
17 pages of specification, and 21 sheets of drawings; and
- 2) This Transmittal/Filing Receipt.

Please send all correspondence regarding this matter to the undersigned at the address shown below.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventors: John Szaro
Gary Shaffer

PROVISIONAL PATENT APPLICATION FOR:

POP-UP SPORTS TRAINING ASSEMBLIES,
AND RELATED DEVICES AND METHODS

FIELD OF THE INVENTION

[0001] The present invention pertains to self-erecting portable traps and goals for use in sports training, and particularly to easily portable goals which erect easily, are highly visible, and effectively stop sports-playing objects such as golf balls, hockey pucks, lacrosse balls, softballs, baseballs and soccer balls. The invention relates also to self-erecting frames which are useful for displaying signage, and particularly for displaying temporary or emergency signage.

KEY ASPECTS OF THE INVENTION

[0002] In one key aspect, the face frames and base frames of assemblies of the invention, such as traps and goals, are held in a particular desired relationship to one another such that their respective three-dimensional shapes are not dependent totally upon the disposition of any netting element. For example, using any of the connectors shown, or any connector that satisfies the structural and functional performance attendant to the shown connectors, the relative positions of the face frame (and its corresponding plane) and the base frame (and its corresponding frame) can be predetermined. Thus, the present invention provides a series of frame stabilizing connectors which are disposed to hold the face frame element of the assembly (goal, trap or backstop) upright with respect to the base element of the assembly. Particular embodiments of the present invention that illustrate this feature include those having two connector elements. Each of the connector elements is disposed between the upright, or face frame element, of the goal and the base element of the goal. Thus, as is shown in Figure 104(b), one end of upright

resilient element 10 is connected to curved stabilizing connector 3 and at the other end of upright element 10 is connected to curved stabilizing connector 9. The other end of connector 9 is attached to base element 21.

[0003] Frame stabilizing connectors of the invention can be in any shape so long as that shape is disposed to holding an end of an upright face element in a desired relation to the end of a base frame element. Typically, this relationship is such that the face frame element is held approximately perpendicular to the plane of the base element. Thus, when the base element is disposed upon the ground, the face frame element is held substantially perpendicular to the ground. As one of skill in the art of sports equipment design will appreciate, connectors of the invention can be adapted and arranged to hold the base and face frame planes of the invention at any desired angle or angles.

[0004] Similarly, as one of skill in the art can also appreciate, the stabilizing connectors of the invention include those whereby the respective base frame elements and face frame elements can be disposed in relation to one another at any desired angle. Nonetheless, the angle must be one such that the face frame of the goal provides an opening for reception of the game playing object. Thus, stabilizing connectors of the invention can be in the shape of a spiral or coil, in the shape of a curved element constructed and arranged to receive the respective face frame and base frame elements and hold them in relation to one another, in the shape of a rectangular bracket such as that shown in Figure 151, or in the shape of an arcuate bracket such as that shown in Figure 103(b).

[0005] Among the advantages of the "slack net" embodiments of the traps, goals and assemblies of the present invention include its ability to assist in dissipating the energy of a sports object, such as a soccer ball, golf ball, lacrosse ball, hockey puck or other sports playing object as the object is driven into the goal. More specifically, because the slack net element hangs down to be disposed in close proximity to the face of the goal, its mass, the totality of which is brought together

because of the interconnectedness of its respective webbing strands, slows the ball or other sports playing object such that the object does not bounce back out of the goal. Instead, the object drops to the ground within the confines of the goal. In contrast, goals such as that shown in the Armell patent, U.S. Patent No. 5,433,433, rely on the netting element of the goal to define the relative positions of the upright portions of the goal and of its base. Because of this, the netting element is held taut between upright and base portions of the goal frame and is thereby much less available to absorb the kinetic energy of a moving sports object such as a soccer ball, golf ball or hockey puck.

[0006] In another key aspect, pop-up frames of the present invention can be adapted and arranged for use in supporting signage, especially of the temporary variety. Instead of a netting element, face frames of the invention can be provided with opaque or translucent materials, for example comprising natural or synthetic fabrics, plastics,

BRIEF DESCRIPTIONS OF THE FIGURES

[0007] **Figure 101(a)** shows acute curved tubular connector 51 describing an arc of less than 90 degrees.

[0008] **Figure 101(b)** shows a right-angle curved tubular connector 52 describing an arc of approximately 90 degrees.

[0009] **Figure 101(c)** shows obtuse curved tubular connector 53 describing an arc of more than 90 degrees.

[0010] **Figure 101(d)** shows acute curved connector 51 having an end of face frame flexible element 10 disposed in one end and an end of base flexible element 21 disposed in the opposite end of connector 51.

[0011] **Figure 102(a)** shows extended right angle tubular connector 58 constructed and arranged for receiving ends of a base frame flexible element and a face frame flexible element.

- [0012] **Figure 102(b)** shows extended right angle connector 59 with an end of face frame flexible element 10 disposed in the bore of one end of connector 59 and an end of base frame element 21 disposed in the bore of the opposite end of curved element 59
- [0013] **Figure 103(a)** shows bracketed curved connector 71 comprising curved tubular element 72 and bracket 74.
- [0014] **Figure 103(b)** shows curved bracketed connector element 71 and the relative of positions of end 12 of face frame flexible element 10 and end 14 of base flexible element 21 disposed in the hollows of tubular 72.
- [0015] **Figure 103(c)** shows a partial cutaway detail of a curved connector element 73, which is similar to curved connector element 71 shown in 103(b) except that connector 73 is constructed and arranged to allow for the free rotation of end 14 of flexible base element 21 with respect to connector 73.
- [0016] **Figure 103(d)** shows rectangular connector element 55 that it is constructed and arranged to hold a base frame member and an upright frame member at approximately a right angle to one another.
- [0017] **Figure 103(e)** shows spirally curved connector element 201 that it is constructed and arranged to hold a base member and an upright member at approximately a right angle to one another.
- [0018] **Figure 104(a)** is a front view of high visibility soccer goal 41 having high-visibility apron 34.
- [0019] **Figure 104(b)** shows a top oblique view of soccer goal 41.
- [0020] **Figure 105(a)** shows a front view of lacrosse goal 44 showing high visibility halo 31 disposed on the outside of face frame flexible element 10.
- [0021] **Figure 105(b)** shows a top oblique view lacrosse goal 41 showing high visibility halo 31 disposed outside of face frame flexible element 10 which is connected to, and held upright with respect to base flexible element 21 by means of curved connectors 3 and 9.
- [0022] **Figure 106(a)** is a front view of golf ball trap 49.
- [0023] **Figure 106(b)** is a top oblique view of golf ball trap 49 as shown in Figure 106(a).

- [0024] **Figure 107** shows golf ball trap 81 comprising face frame flexible element 10 which defines a margin of the main goal, and inner goal target 85 having rim 84 defining the margins of inner goal opening 83 and netting element 86.
- [0025] **Figure 110** shows freestanding sports trap frame 100 including base flexible element 21, face frame flexible element 10, left curved connector 3, right curved connector 9, and pliable tension strap 15.
- [0026] **Figure 151** shows a slack-net version sports-playing object trap 100 of the present invention, and a detail of rectangular stabilizing connector 55 disposed at both right and left end corners of the goal. Rectangular connector 55 is similar to that shown in Figure 103(d)
- [0027] **Figure 154** shows a slack-net version sports-playing object trap 100 of the present invention, and a detail of spiral stabilizing connector 201 disposed at both right and left end corners of the goal. Rectangular connector 201 is similar to that shown in Figure 103(e)
- [0028] **Figure 160** shows extended freestanding sports trap frame 200 including wide red pliable tension strap 215. Face frame top connector 213 connects face frame flexible elements 240 and 220 together.
- [0029] **Figure 181(a)** shows a side view of freestanding sports trap frame 100, wherein right connector 9 connects base frame flexible element 21 to face frame flexible element 10 at approximately 90 degrees.
- [0030] **Figure 181(b)** shows a side view of freestanding sports trap frame 100 of Figure 181(a) having slack netting element 174 disposed between face frame element 10 and base frame element 21.
- [0031] **Figure 181(c)** shows a side view of freestanding sports trap frame 100 having slack netting element 179, which is longer and wider than netting element 174 of Figure 181(b), disposed between face frame element 10 and base frame element 21.
- [0032] **Figure 181(d)** shows a side view of the freestanding sports trap frame 100 of Figure 181(c) and having soccer ball 193 shown in flight and impinging upon netting element 179.

[0033] **Figure 213(a)** shows an oblique view of observable sports-training trap 200 with longer frame element 210 disposed as the trap opening for receiving a sports-playing object.

[0034] **Figure 213(b)** shows an oblique view of observable sports-training trap 200 with shorter frame element 221 disposed as the trap opening for receiving a sports-playing object.

DETAILED DESCRIPTION OF THE INVENTIONS

[0035] **Figure 101(a)** shows acute curved tubular connector 51 describing an arc of less than 90 degrees. Thus, rods, tubes or flexible elements disposed partially within, and extending from, curved element 51 will form an obtuse angle with one another.

[0036] **Figure 101(b)** shows right-angle curved tubular connector 52 describing an arc of approximately 90 degrees. Thus, rods, tubes or flexible elements disposed, partially within, and extending from curved element 52 will form an angle of approximately 90 degrees with one another.

[0037] **Figure 101(c)** shows obtuse curved tubular connector 53 describing an arc of more than 90 degrees. Thus, rods, tubes or flexible elements disposed partially within, and extending from, curved element 53 will form an acute angle with one another.

[0038] **Figure 101(d)** shows acute curved connector 51 having an end of face frame flexible element 10 disposed in one end and an end of base flexible element 21 disposed in the opposite end of connector 51.

[0039] **Figure 102(a)** shows extended right angle tubular connector 58 constructed and arranged for receiving ends of frame flexible elements.

- [0040] **Figure 102(b)** shows extended right angle connector 59 with end 11 of face frame flexible element 10 disposed in the bore of one end of connector 59 and end 22 of base frame element 21 disposed in the bore of the opposite end of curved element 59. Curved element 59 is also provided with positioning keepers 61 disposed on the outside of curved element 59 for receipt of other elements such as connector straps or anchors.
- [0041] **Figure 103(a)** shows bracketed curved connector 71 comprising curved tubular element 72 and bracket 74. With respect to Fig. 103(a), bracket 74 is provided with apertures 38, 39 and 40 useful as attachment points for such accessories as anchors, connector straps, and goal line positioning aids.
- [0042] **Figure 103(b)** shows bracketed curved connector element 71 and the relative of positions of end 12 of face frame flexible element 10 and end 14 of base flexible element 21 disposed in the hollows of tubular element 72. With respect to Fig. 103(b), END 14 OF flexible base element 21 is shown disposed within tubular portion 72 of connector 71 and end 12 of face frame flexible element 10 is shown disposed within the bore of upright tubular portion of connector 71.
- [0043] **Figure 103(c)** shows a partial cutaway detail of a curved connector element 73, which is similar to curved connector element 71 shown in 103(b) except that connector 73 is constructed and arranged to allow for the free rotation of end 14 of flexible base element 21 with respect to connector 73. Thus, in curved connector element embodiment 73, tubular bore 18 is provided with ring-trapping groove 25 which is disposed for trapping split ring 29 which is disposed in ring groove 28 disposed near end 14 of base flexible element 21.
- [0044] **Figure 103(d)** shows rectangular connector element 55 that it is constructed and arranged to hold a base frame member and an upright frame member at approximately a right angle to one another. With respect to Fig. 103(d), end 22 of flexible base frame element 21 is shown disposed within the tubular bore of the

rear portion of connector 55, and end 11 of face frame element 10 is shown within the upright tubular bore of the front portion of connector 55. Connector 55 is provided with front aperture 191 and rear aperture 190 which are useful for attaching accessories, such as anchors or netting elements, to connector 55.

[0045] Figure 103(e) shows spirally curved connector element 201 that it is constructed and arranged to hold a base member and an upright member at approximately a right angle to one another. With respect to Fig. 103(e), spirally curved connector element 201 is provided with face frame end 203 for receiving a base frame element, face frame end 205 for receiving a base frame element, slotted loop portion 208, and slotted opening 209. Portions 208 and 209 are useful for attaching one or more netting elements to the frame, or and for attaching a strap element to each of two connectors of a sports frame in use, and to thereby determine the distance between the two connectors. Portions 208 and 209 are useful also for attaching accessories such as anchors.

[0046] Connectors of the invention can be made of any material sufficiently strong to fulfill the needs of holding the frame elements in a fixed, or relatively fixed, position with respect to one another while withstanding the forces and stresses inherent to the use of such devices, including those inherent to the activities of the particular activities and games for which the present devices are suitable. In doing so, the connectors combine with the frame elements to approximate two intersecting planes, that of the face frame, and the plane of the base frame. Suitable materials include, but are not limited to, aluminum, steel, fiberglass, carbon fiber, and plastics, such as ABS and glass-filled plastics.

[0047] Flexible frame elements of the many permutations of the invention can be made of any material sufficiently strong, resilient and flexible enough to fulfill the needs of a particular embodiment of frame elements of the invention, for example, fiberglass, aluminum, carbon fiber, metallic wire such as steel or those of copper alloys, and plastics, such as ABS and glass-filled plastics. Materials for use in the

invention are selected according to the requirements of the specific embodiments, and particularly with respect to size, thickness, strength and flexibility.

[0048] **Figure 104(a)** is a front view of high visibility soccer goal 41 having high-visibility apron 34. In Figure 104(a), high visibility apron 34 is disposed within the main opening formed by face frame flexible element 10. With respect to Fig. 104(a), high-visibility apron 34 may comprise any material which is brightly colored, highly reflective, iridescent, fluorescent or luminescent. Such materials include, but are not limited to synthetic or natural fabrics, plastic sheeting or fabric such as nylon or polyester, or fringes comprising these materials. Nylon or polyester fabrics are particularly adaptable for use as aprons for the invention, as are plastics such as Kevlar or Mylar.

[0049] Apron 34 of the invention may be contiguous with the one or more netting elements of the invention and may be provided in sleeve forms, such as those adaptable for use with lighting elements such as light bars, light strings and chemoluminescent lighting elements. Apron 34 of the invention may also comprise one or more sleeves or pocket elements that are adapted and arranged for displaying placards or signs such as those identifying a sports team or sponsor.

[0050] **Figure 104(b)** shows a top oblique view of soccer goal 41. In figure 104(b), high visibility apron 34 is shown disposed inside of face frame flexible element 10 and substantially within a plane formed by flexible element 10. Soccer goal 41 is also provided with pliable tension strap 15 disposed between curved connector 3 and curved connector 9 which are constructed and arranged to hold face frame flexible element 10 upright with respect to base flexible element 21.

[0051] High-visibility halo 41 may comprise any material which is brightly colored, highly reflective, iridescent, fluorescent or luminescent. Such materials include, but are not limited to synthetic or natural fabrics, plastic sheeting or fabric such as nylon or polyester, or fringes comprising these materials. Nylon or polyester

fabrics are particularly adaptable for use as aprons for the invention, as are plastics such as Kevlar or Mylar.

[0052] Halo 41 of the invention may be contiguous with the one or more netting elements of the invention and may be provided in sleeve forms, such as those adaptable for use with lighting elements such as light bars, light strings and chemoluminescent lighting elements. Halo 41 of the invention may also comprise one or more sleeves or pocket elements that are adapted and arranged for displaying placards or signs such as those identifying a sports team or sponsor. Halo 41 may be supported above and outside of frame element by any means which provides support for a substantial portion of the halo, such as a flexible support element comprising wire or fiberglass disposed within a sleeve of halo 41 and having its ends disposed within pockets proximate to the stabilizing connectors of the invention.

[0053] Figure 105(a) shows a front view of lacrosse goal 44 showing high visibility halo 31 disposed on the outside of face frame flexible element 10. With respect to Fig. 105(a), high visibility halo 31 includes placard sleeve or area 36 constructed and arranged for displaying a team name, sponsor name or motto, etc.

[0054] Figure 105(b) shows a top oblique view lacrosse goal 41 showing high visibility halo 31 disposed outside of face frame flexible element 10 which is connected to, and held upright with respect to base flexible element 21 by means of curved connectors 3 and 9. Lacrosse goal 41 is also provided with netting 16 disposed between base flexible element 21 and face frame flexible element 10.

[0055] Figure 106(a) is a front view of golf ball trap 49. Golf ball trap 49 includes high visibility halo 31 and high visibility apron 34. High visibility halo 31 is disposed outside of face frame flexible element 10 while high visibility apron 34 is disposed inside of face frame flexible element 10 to thereby provide a high visibility aspect ratio.

- [0056] **Figure 106(b)** is a top oblique view of golf ball trap 49 as shown in Figure 106(a). With respect to Figure 106(b), high visibility apron 34 is shown disposed inside of face frame flexible element 10, and high visibility halo 31 is shown disposed outside face frame flexible element 10.
- [0057] **Figure 107** shows golf ball trap 81 comprising face frame flexible element 10 which defines a margin of the main goal, and inner goal target 85 having rim 84 defining the margins of inner goal opening 83 and netting element 86. With respect to Figure 107, inner goal target 85 is suspended from frame flexible element 10 by a plurality of suspension straps to provide a "goal within a goal." The goal-within-a-goal is smaller than that formed by flexible frame element 10, and therefore more difficult to hit with as game-playing object, such as a hockey puck or golf ball.
- [0058] **Figure 110** shows freestanding sports trap frame 100 including base frame flexible element 21, face frame flexible element 10, left curved connector 3, right curved connector 9, and pliable tension strap 15. In some embodiments, tension strap 15 is provided in a length-adjustable form so that the distance between connectors 3 and 9, and thus the distance between the ends of face frame element 10, can be adjusted to make the face opening wider, narrower, taller, or of a different shape. Strap 15 can be rendered adjustable, for example, by a buckle or slide adjuster as is known in the sporting goods arts. With respect to Fig. 110, connectors 3 and 9 can be of any configuration which fulfills the key parameter of a connector of the invention, that is, a connector is constructed and arranged to hold the ends of face frame flexible element 10 in a desired position with respect to the ends of base flexible element 21. For example, one or more of spiral connector 201, rectangular connector 55, bracketed curved connector element 71, connector element 73, or curved connectors 51, 52, 53, 58 and 59 can be used to fulfill this function.

[0059] Face frame element 10 and connectors 3 and 9 join to approximate a plane. Similarly, base frame element 21 and connectors 3 and 9 join to approximate a plane. Thus, in its playing position, the plane of the face frame is held at a substantially fixed angle to the plane of the base frame. This fixed angle is preferably within 25 degrees of 90 degrees, that is, the planes of the base frame and face frame are held within 65 degrees to 115 degrees with respect to one another, and more preferably within 15 degrees of 90 degrees, that is, the planes of the base frame and face frame are held within 75 degrees to 105 degrees of one another.

[0060] A significant element of sports trap frame 100 is that it is freestanding, that is, in its unfolded (playing) position, with base frame flexible element 21 disposed on a playing surface such as a the ground of a field or the floor of a gymnasium, face frame flexible element 10 is held upright without the need of a netting element. Because of this freestanding characteristic, one or more netting elements can be draped from face frame flexible element 10 such that they cascade toward the ground to be disposed near the plane formed by face frame element 10. Thus, in some preferred embodiments, the amount, or length, of netting provided is significantly more than that required to bridge the distance between the rear portion of base frame element 21 and the top portion of face frame element 10.

[0061] Disposed in such a "slack-net" position, the mass of the netting element is available to dissipate the kinetic energy of a sports playing object, such as a soccer ball, hockey puck, golf ball or lacrosse ball which is driven into it. In contrast, portable nets such as those shown in U.S. Patent 5,433,433 to Armell rely upon the netting element to control the distance between the base element and the vertical, or upright, element. Thus, the netting element of Armell is held tautly in tension and would tend to deflect an object driven into it downwardly and outwardly much more than a slack net version of the present invention. Thus, the sports goal of Armell would tend to deflect the playing object back toward the playing field.

[0062] **Figure 151** shows a slack-net version of sports-playing object trap 100 of the present invention, and a detail of rectangular stabilizing connector 55 disposed at both right and left end corners of the sports training goal. With respect to Fig. 151, rectangular connector 55 is similar to that shown in Figure 103(d). In Figure 151, end 11 of face frame flexible element 10 is shown disposed within rectangular connector 55. Rectangular connector 55 is provided with apertures 190 and 191. Also, end 22 of base frame element 21 is shown disposed within element reception portion 57 of rectangular connector 55. Moreover, end 11 of face frame element 10 is shown disposed within face frame portion 54 of connector 55.

[0063] **Figure 154** shows a slack-net version sports-playing object trap 100 of the present invention, and a detail of spiral stabilizing connector 201 disposed at both right and left end corners of the goal. With respect to Fig. 154, rectangular connector 201 is similar to that shown in Figure 103(e).

[0064] **Figure 160** shows freestanding sports trap frame 200 including base frame flexible element 21, first face frame flexible element 240, second face frame flexible element 220, left curved connector 3, right curved connector 9, and wide red pliable tension strap 215. Face frame top connector 213 connects ends of first face frame flexible element 240 and second face frame flexible element 220 together. Thus, the absolute length of the face frame, and thus the size of the goal opening, can be varied or adjusted by the selection of face frame elements 220 and 240 of appropriate lengths. Wide tension strap 215 is preferably provided in a bright color such as red or yellow, or it can be provided in white, for example, to match a chalked goal line. Additional face frame flexible elements can be provided as desired in order to adjust or vary the relative size of the face frame.

[0065] In some preferred embodiments of sports trap frame 200, tension strap 215 is provided in a length-adjustable form so that the distance between connectors 3 and 9, can be adjusted to make the face opening wider, narrower, taller, or of a different shape. In other preferred embodiments, tension strap 215 can be disposed more

forwardly to have its front margin align with the plane of the face of sports trap frame 200, which can be aligned with the goal line of a playing field or area. Moreover, strap 215 can be provided in a width identical to the width of the goal line with which it will be used.

[0066] **Figure 181(a)** shows a side view of freestanding sports trap frame 100, wherein right connector 9 connects base frame flexible element 21 to face frame flexible element 10 at approximately 90 degrees. Thus, face frame element 10 approximately describes, and lies substantially within, the face plane of the trap, and base frame element 21 approximately describes, and lies substantially within, the base frame plane of the trap.

[0067] **Figure 181(b)** shows a side view of freestanding sports trap frame 100 of Figure 181(a), and further comprising slack netting element 174 disposed between face frame element 10 and base frame element 21. The dimensions, that is, the length and width of netting element 174, are such that it is not taut, and it forms curvature R1 between frame elements 10 and 21 when the trap is at rest and in its playing position.

[0068] **Figure 181(c)** shows a side view of freestanding sports trap frame 100 having slack netting element 179, which is longer and wider than netting element 174 of Figure 181(b), disposed between face frame element 10 and base frame element 21.

[0069] The dimensions of netting element 179, that is its length and width, are such that it is not taut, and it forms curvature R2 between frame elements 10 and 21 when the trap is at rest and unfolded into its playing position. The dimensions of netting element 179 are longer and wider than netting element 174, such that element 179 drapes from face frame element 10 so that more of the net is disposed toward the face and base of trap 100 than the quantity of netting element 174 as shown in Figure 181(b). Netting 179 thus forms curvature R2, which is of a smaller radius than curvature R1. Because of this, the mass of netting element 179 is disposed

more forwardly in trap 100 and is thereby available to absorb the kinetic energy of a sports object driven into it, such as a hockey puck, golf ball, soccer ball or lacrosse ball.

[0070] **Figure 181(d)** shows a side view of the freestanding sports trap frame 100 of **Figure 181(c)** but having soccer ball 193 shown in flight and impinging upon netting element 179. With respect to **Figure 181(d)**, the kinetic energy of soccer ball 193 distends netting element 179 such that the mass of the netting element absorbs a sufficient amount of the kinetic energy of ball 193, that it is likely to be trapped within the borders of sports trap 100. In doing so, distended netting element 179 temporarily forms curvature R3, which is of a shorter radius than that of R2.

[0071] As one of skill in the art can appreciate, many other embodiments of the slack-net versions of the invention are possible within the scope of the invention, and particularly advantageous are those having an even greater proportional amount of netting element. Some desired embodiments include those netting elements which are of sufficient dimension to contact all of the surface encompassed by base flexible element 21, and of even greater dimensions (not shown). By providing more net than is necessary to span the shortest distance between the margins of frame elements 10 and 21, the present invention allows the mass of the netting element to be available for absorbing the energy of a sports playing object.

[0072] **Figure 213(a)** shows an oblique view of obversible sports-training trap 200 with longer frame element 210 disposed as the trap opening for receiving a sports-playing object, and shorter frame element 221 disposed as the base for trap 200. Sports-training trap 200 is constructed and arranged such that either frame element can be disposed toward a playing field to thereby provide a goal or trap which can be disposed with either of its two openings as the target in use. Thus, trap 200 provides goals or traps of different sizes.

[0073] **Figure 213(b)** shows an oblique view of observable sports-training trap 200 with shorter frame element 221 disposed as the trap opening for receiving a sports-playing object, and longer frame element 210 disposed as the base for trap 200. In accordance with other aspects of the invention, the frame element connectors of observable sports-training sports object trap 200 can be of any configuration which fulfills the key parameter of a connector of the invention, that is, that it be constructed and arranged to hold the ends of face frame flexible element 10 in a desired position with respect to the ends of base flexible element 21. For example, one or more of spiral connector 201, rectangular connector 55, bracketed curved connector element 71, connector element 73, or curved connectors 51, 52, 53, 58 and 59.

[0074] In accordance with the several objects of the invention, numerous permutations and embodiments of a pop-up frame assembly suitable for holding a netting element are provided. In one class of embodiments of the invention, the frame assembly comprises at least one resilient face frame element, the face frame element having a base first end and a base second end, at least one resilient base frame element, the base frame element having a base first end and a base second end, a first connector, the first connector having a face fitting which is constructed and arranged to connect the first end of the face frame element to the first end of the base element, and a base fitting which is constructed and arranged to connect the first end of the face frame element to the first end of the base frame element, and a second connector, the second connector having a face fitting which is constructed and arranged to connect the second end of the face frame element to the second end of the base element, and a base fitting which is constructed and arranged to connect the first end of the face frame element to the first end of the base frame element. In some preferred embodiments, a pop-up assembly of the invention may further comprise at least one netting element.

[0075] The pop-up assembly may further comprise at least one interposable face frame element, such as a rod or tube, and at least one corresponding connection member

for connecting the interposable face frame element to the resilient face frame element. In accordance with other objects, a pop-up assembly of the invention may further comprise an apron disposed within the margins formed by the face frame element, and may yet further comprise a halo disposed outside of the margins formed by the face frame element. Preferably, each of the halo and apron comprise at least one high-visibility material.

[0076] The frame flexible elements of the invention can be provided in the form of rods are tubes which are constructed and arranged to fit within, or on the outside of portions of the connectors. Moreover, frame elements of the invention can also be provided in pre-bent angles or shapes in order to provide for face frame openings of desired shape and dimensions.

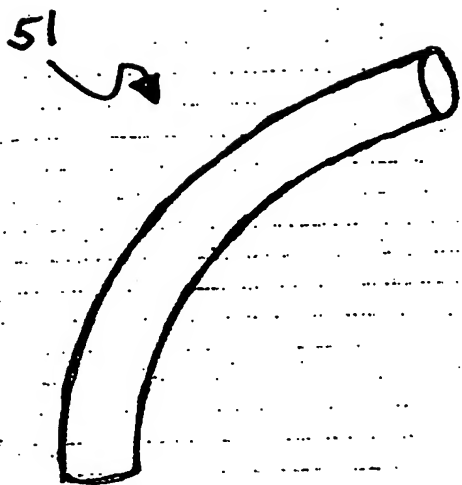


FIG. 101 (A)

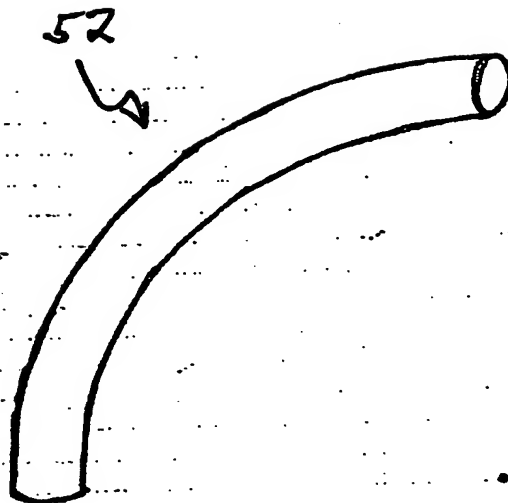


FIG. 101 (B)

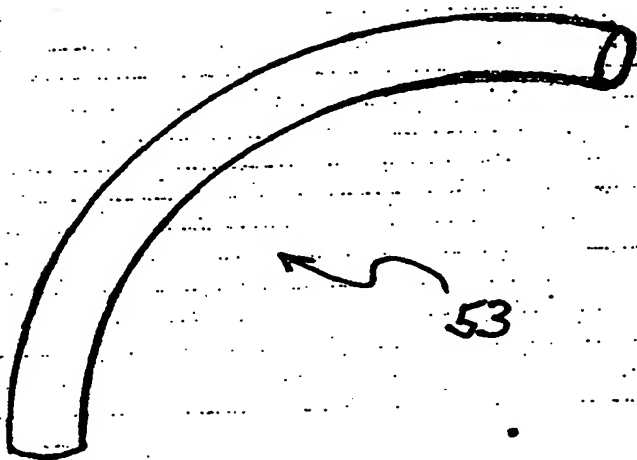
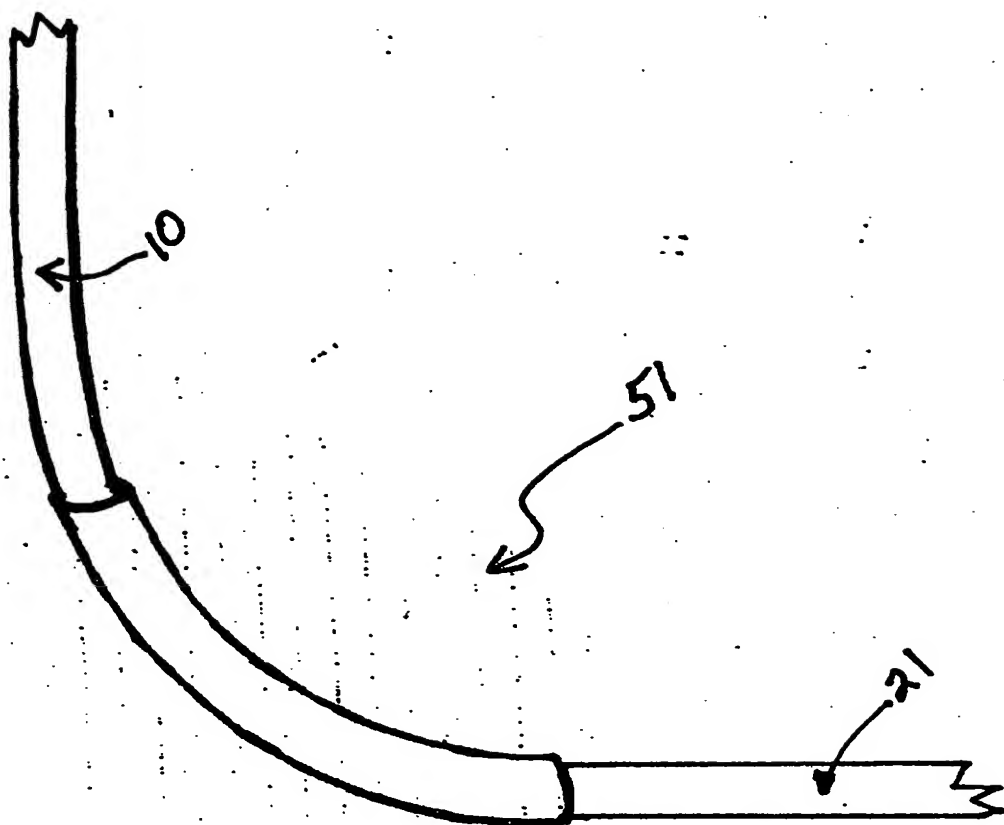


FIG. 101 (C)



101 (D)

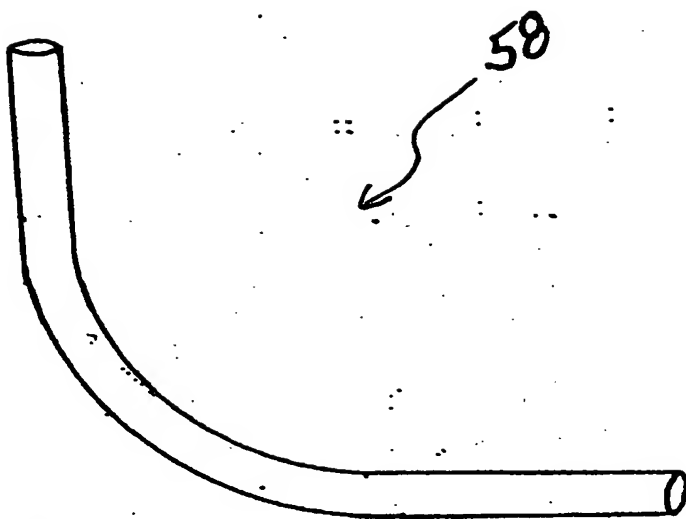


Fig. 102(a)

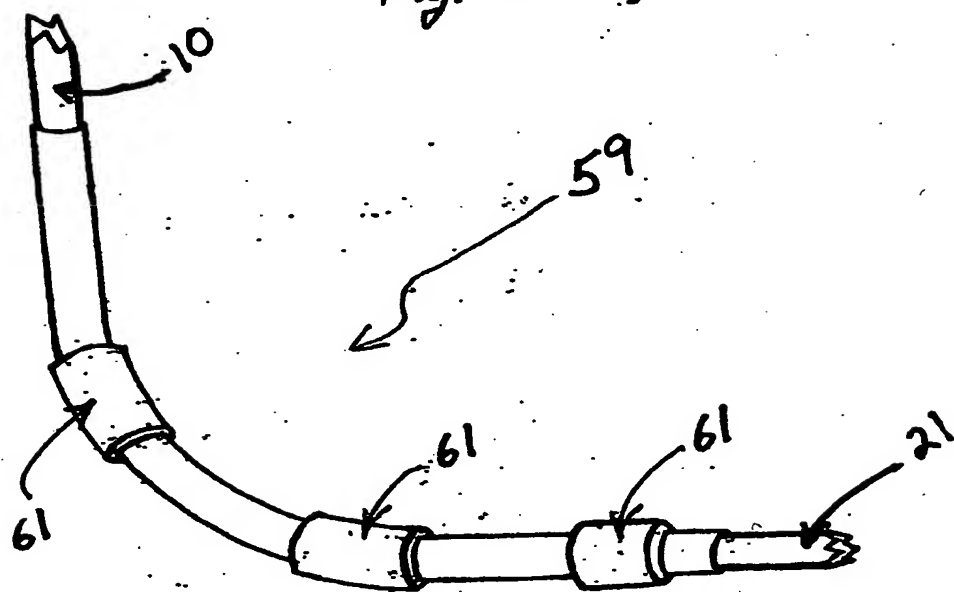


Fig. 102(b)

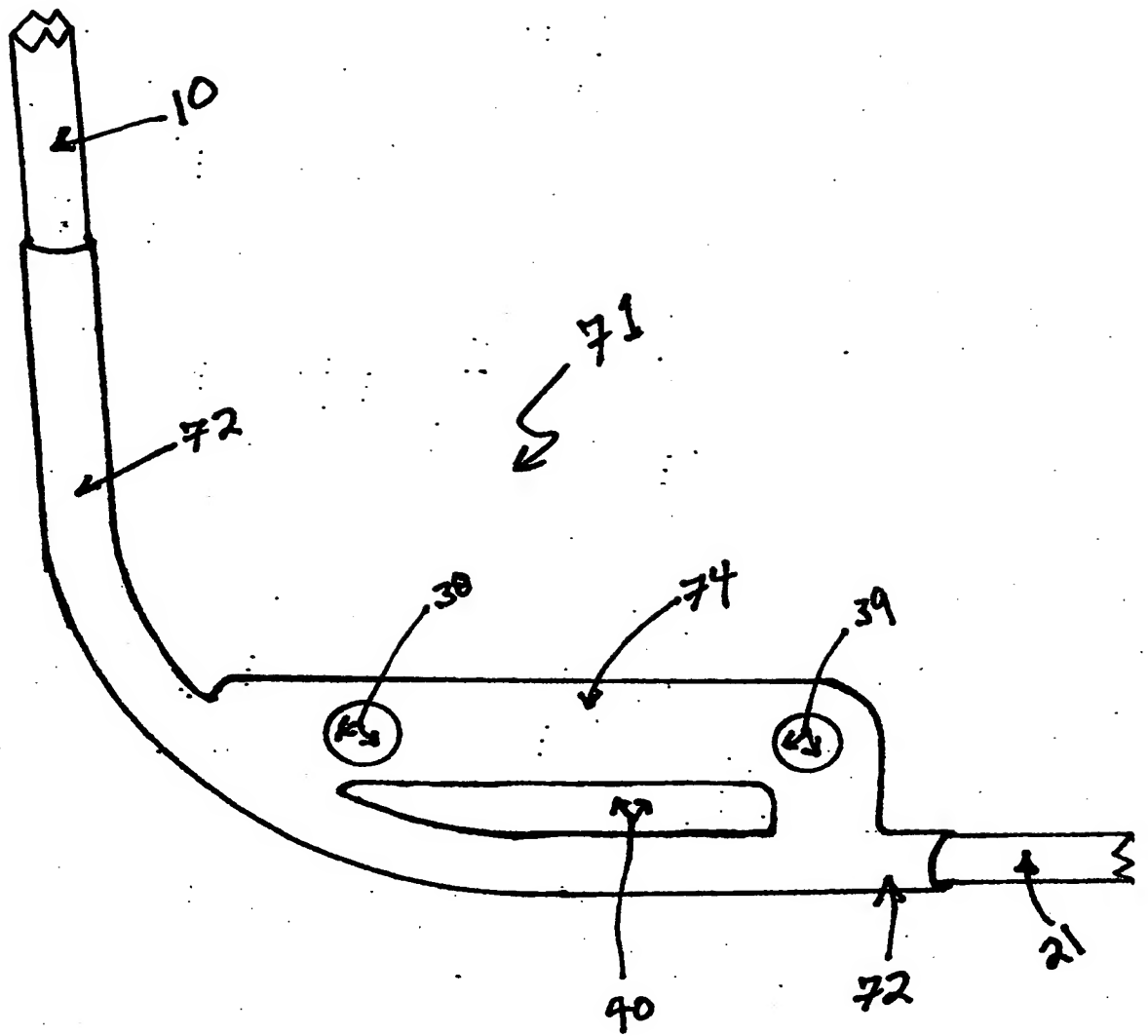


FIG. 103 (a)

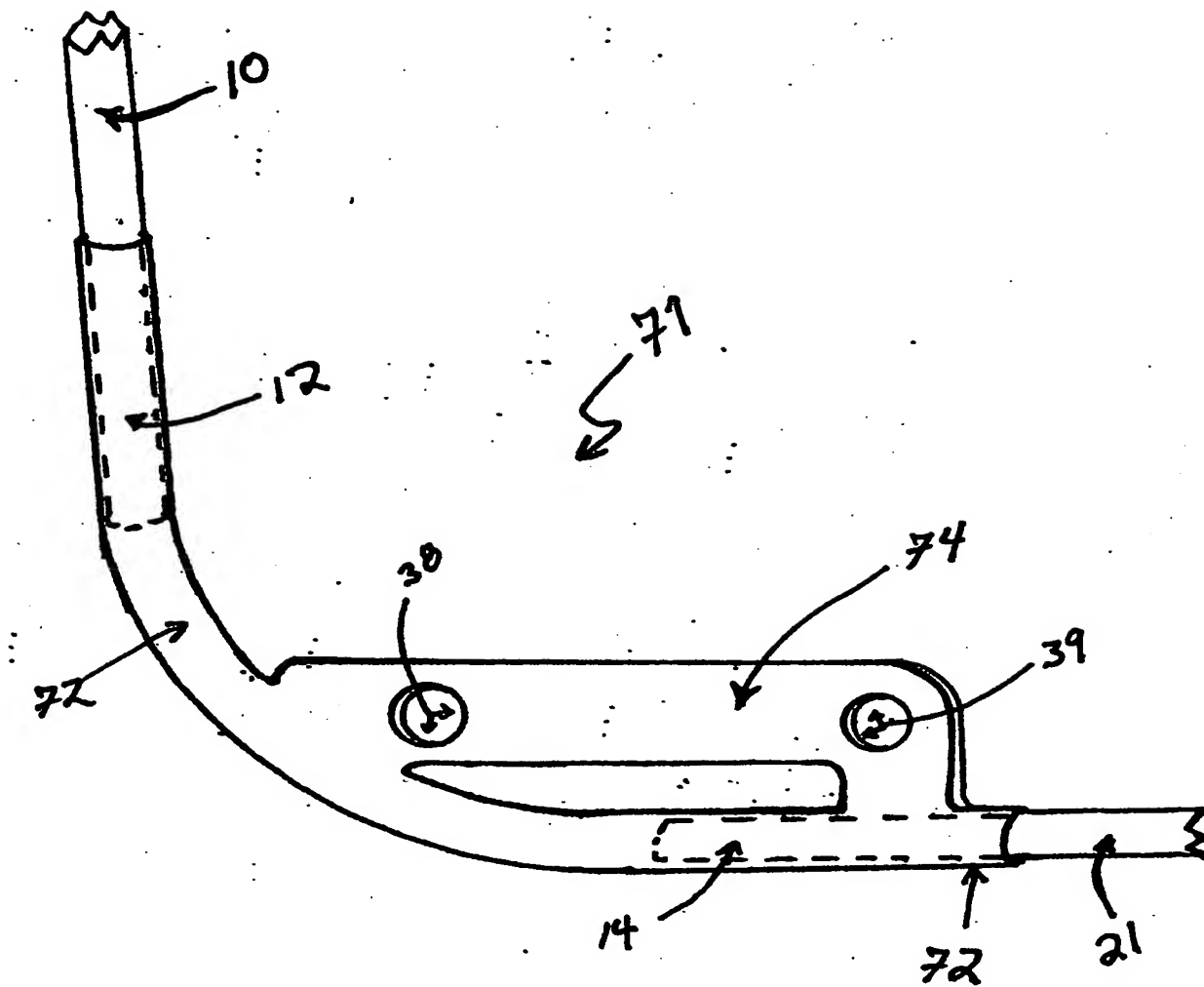


FIG. 103(b)

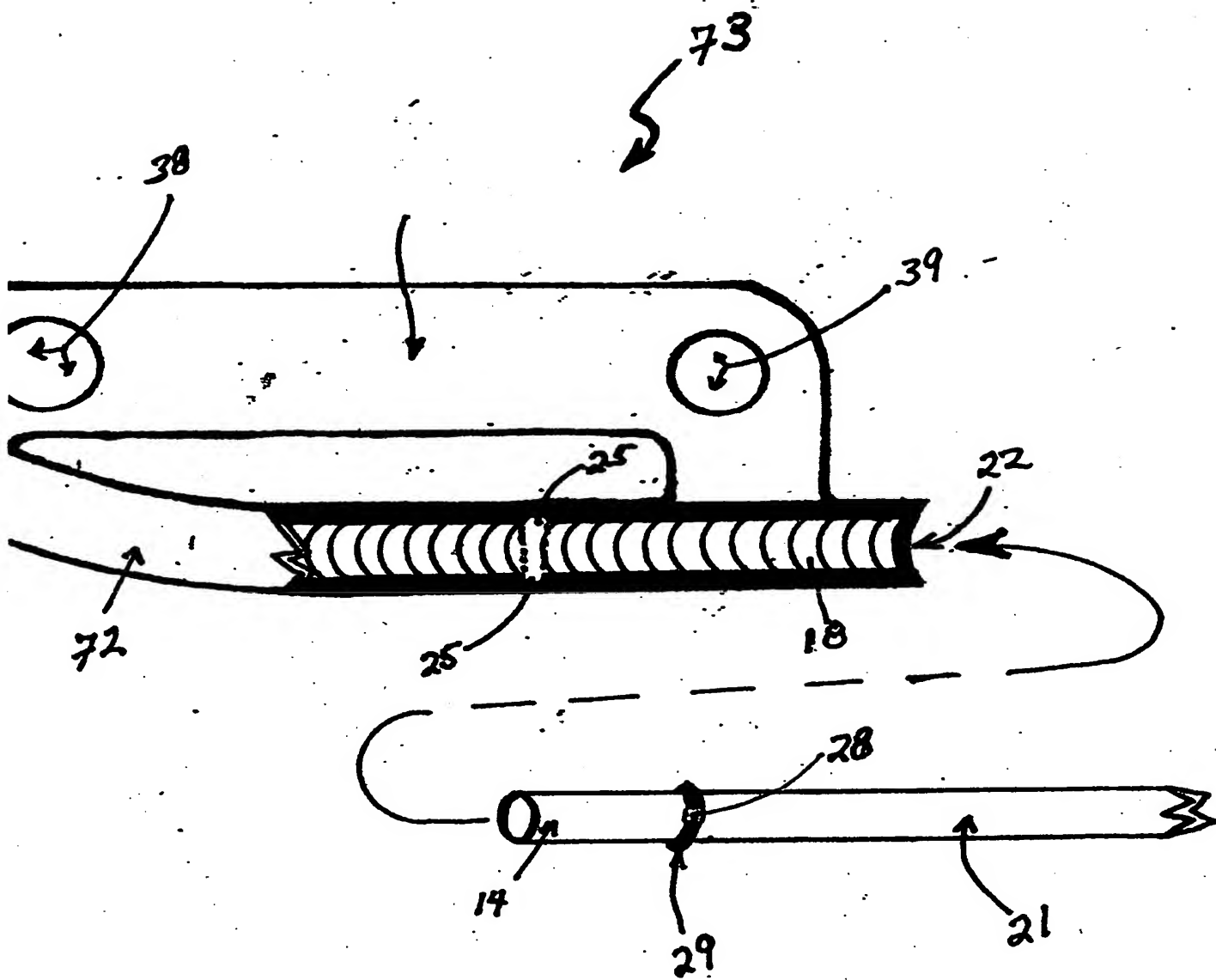


Fig. 103 (c)

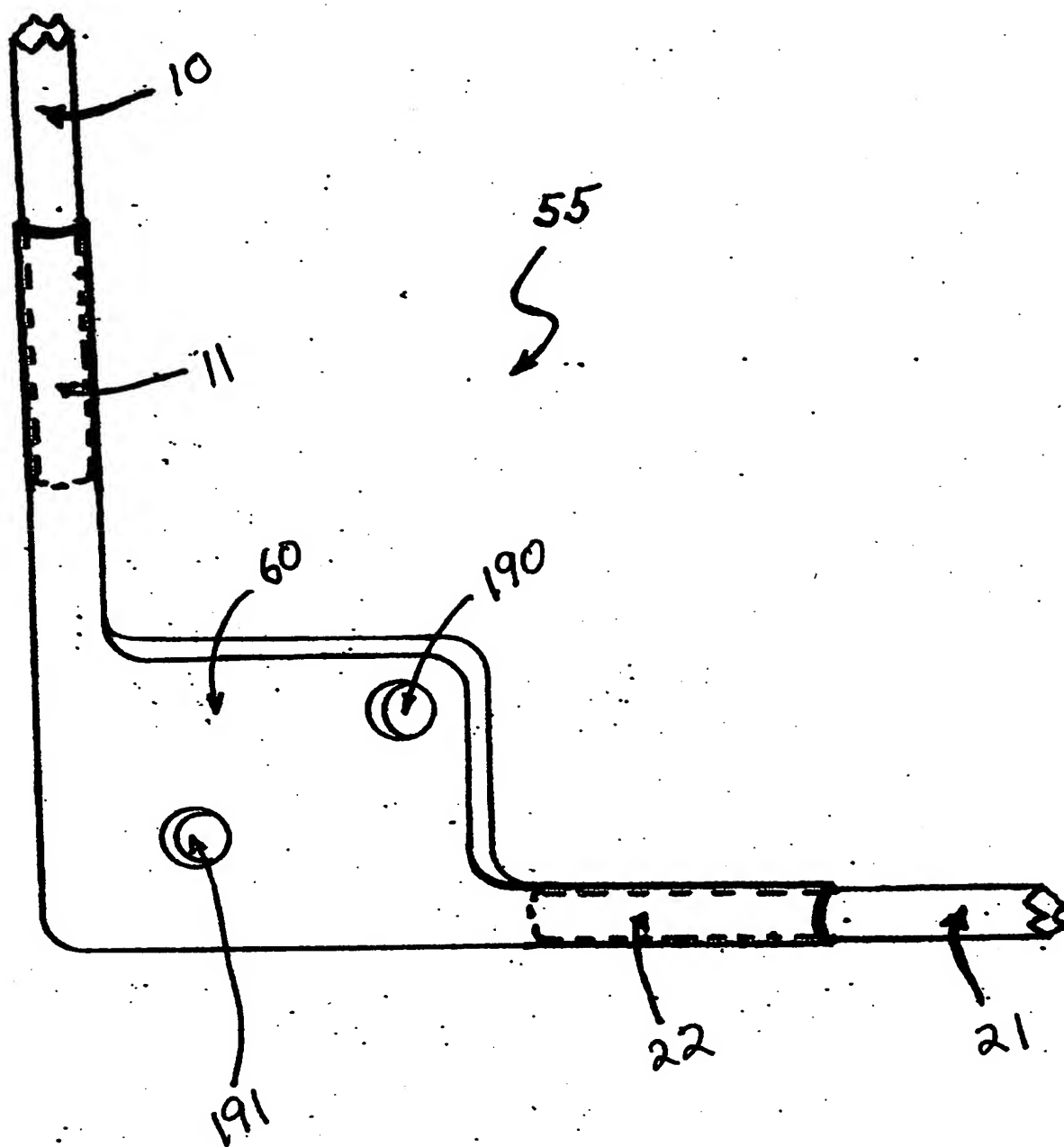


Fig. 103(d)

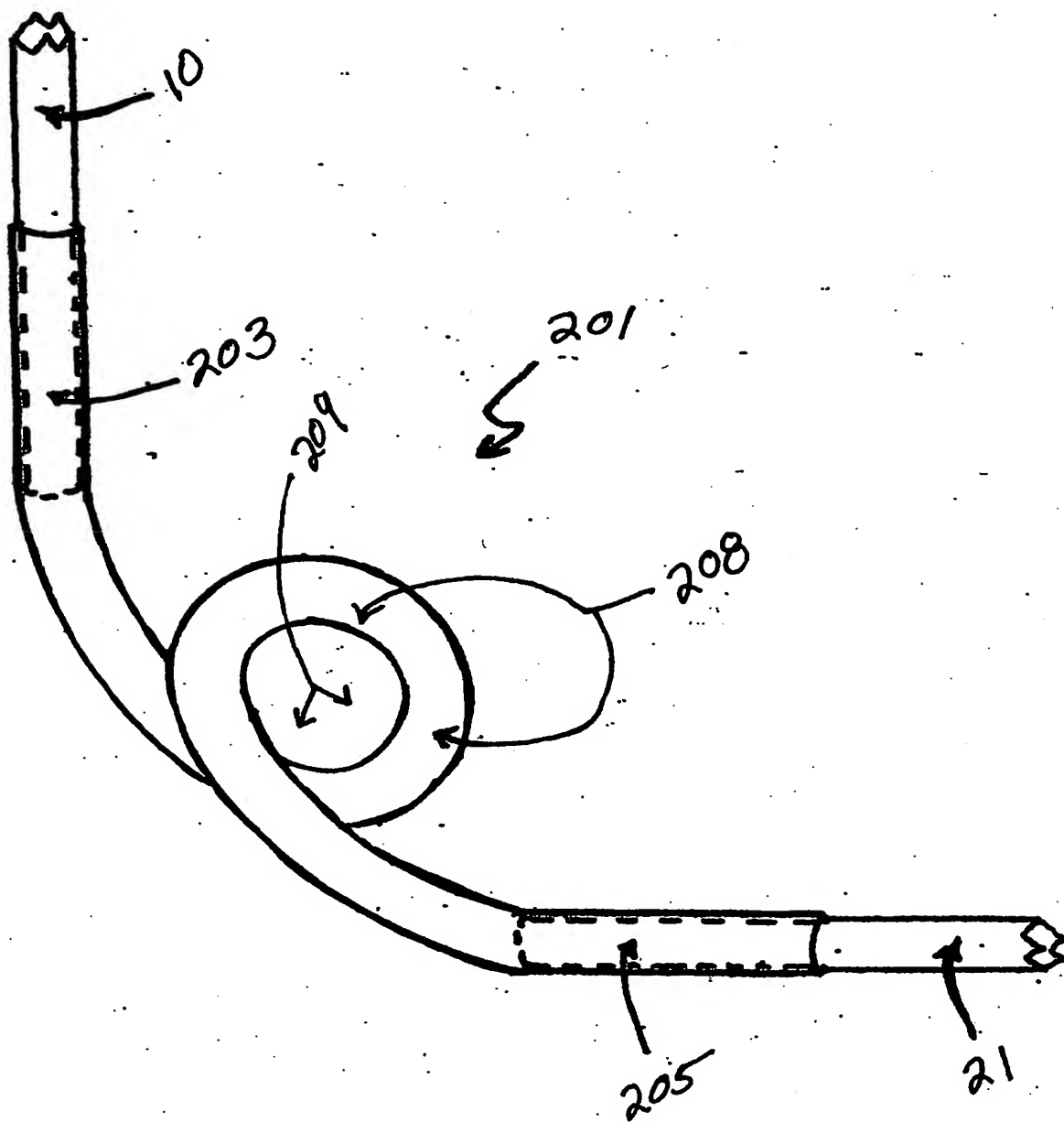


Fig. 103(e)

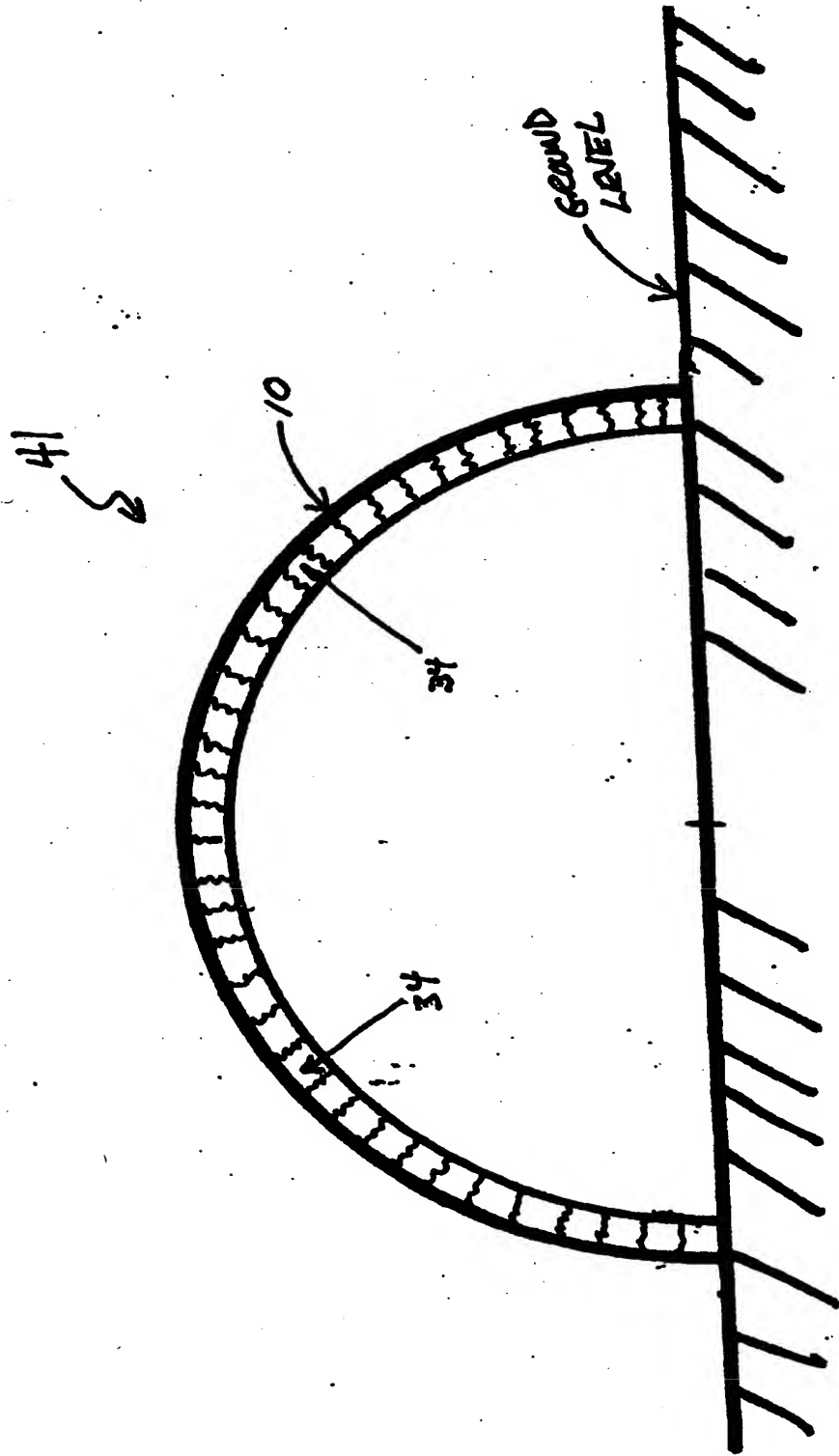


FIG. 104 (A)

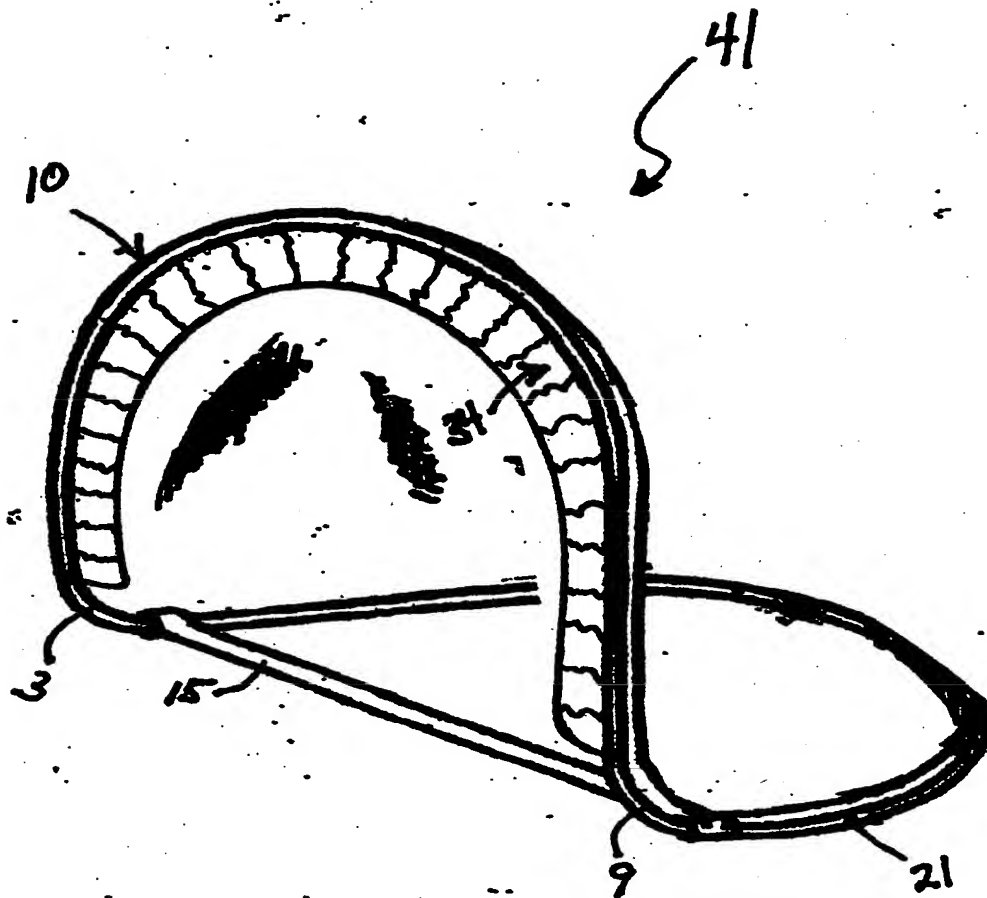


FIG. 104(B)

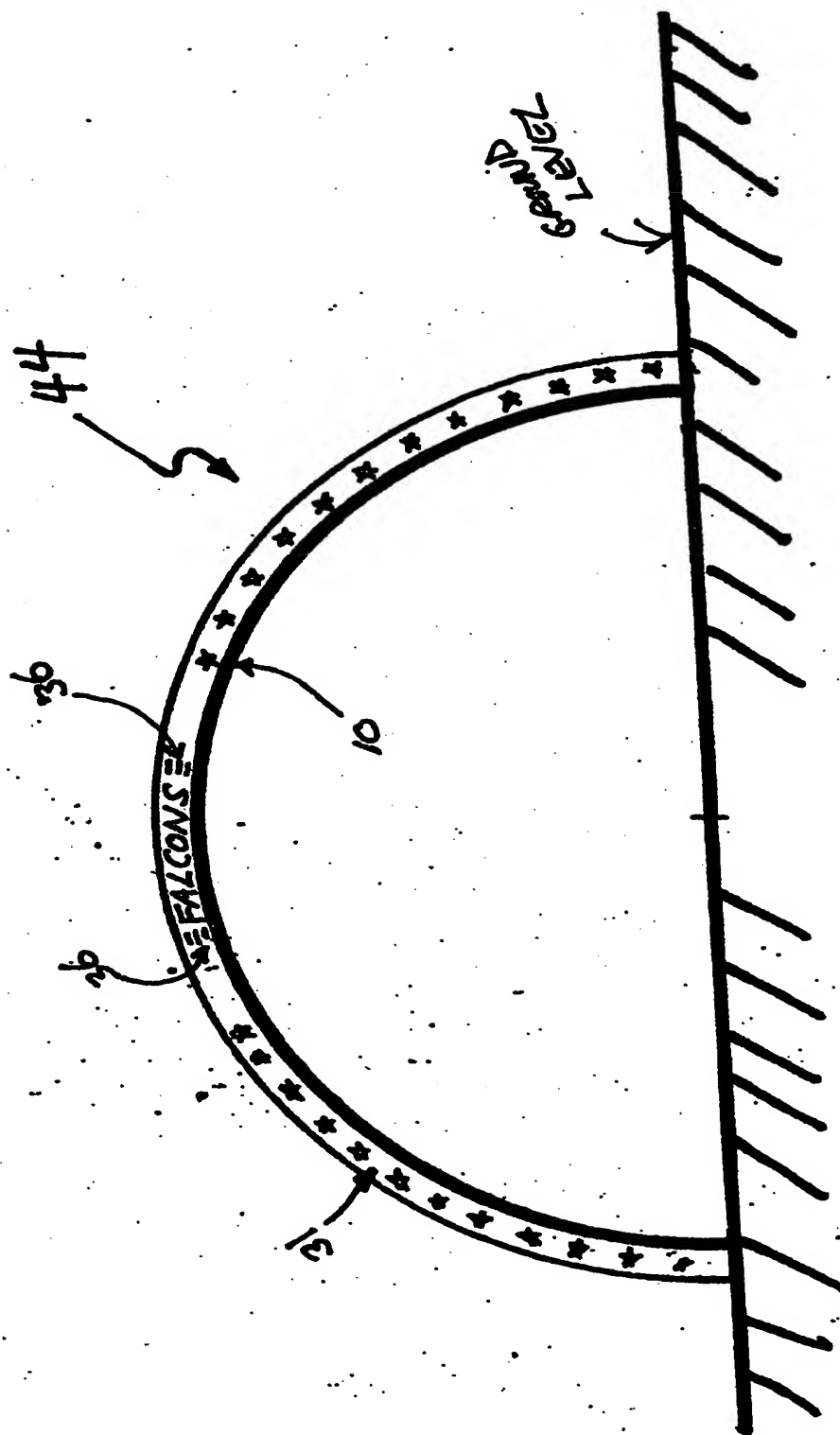


FIG. 105(A)

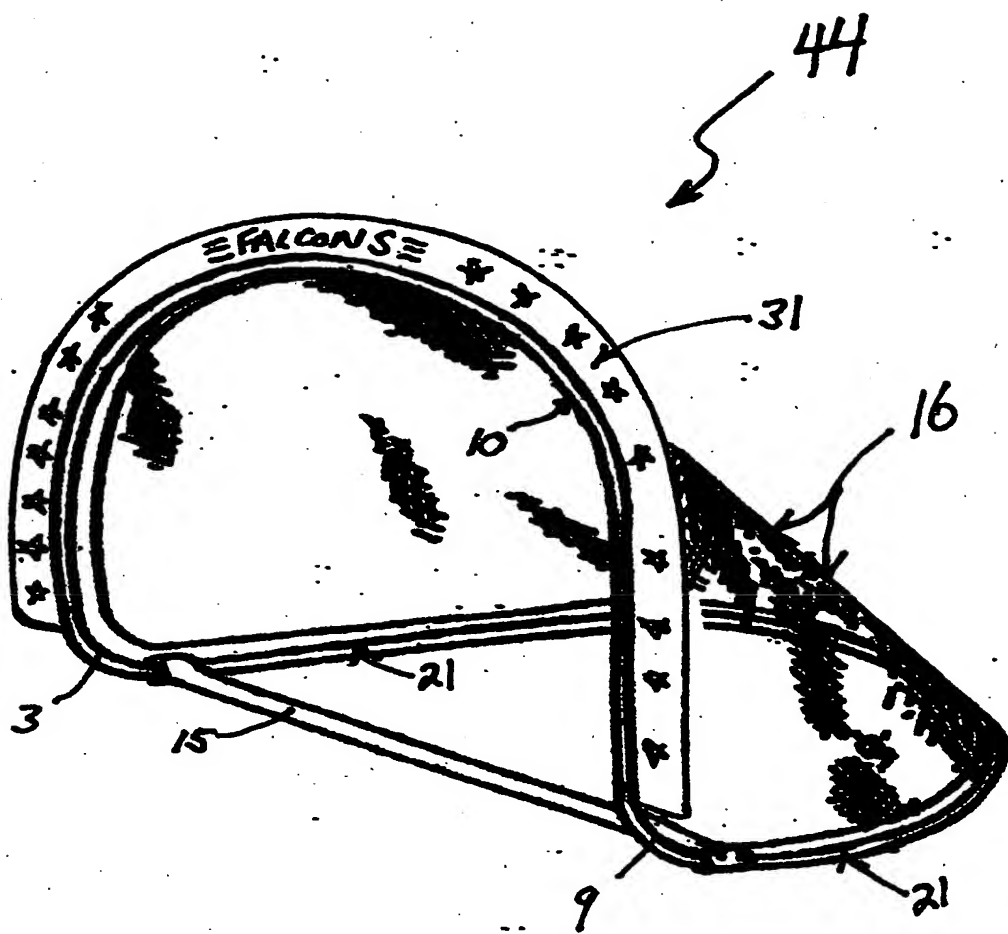


FIG. 105 (B)

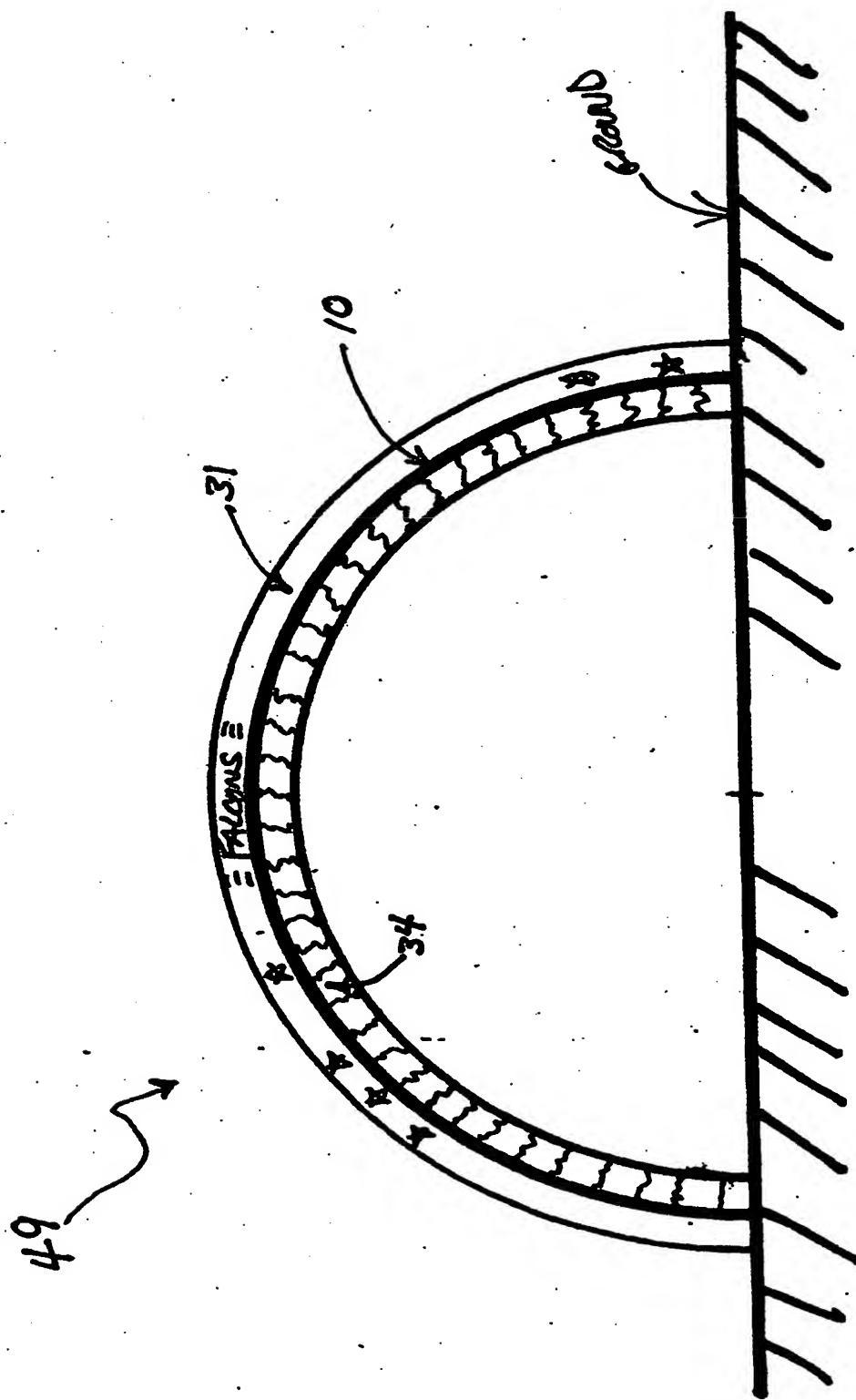


FIG. 106(A)

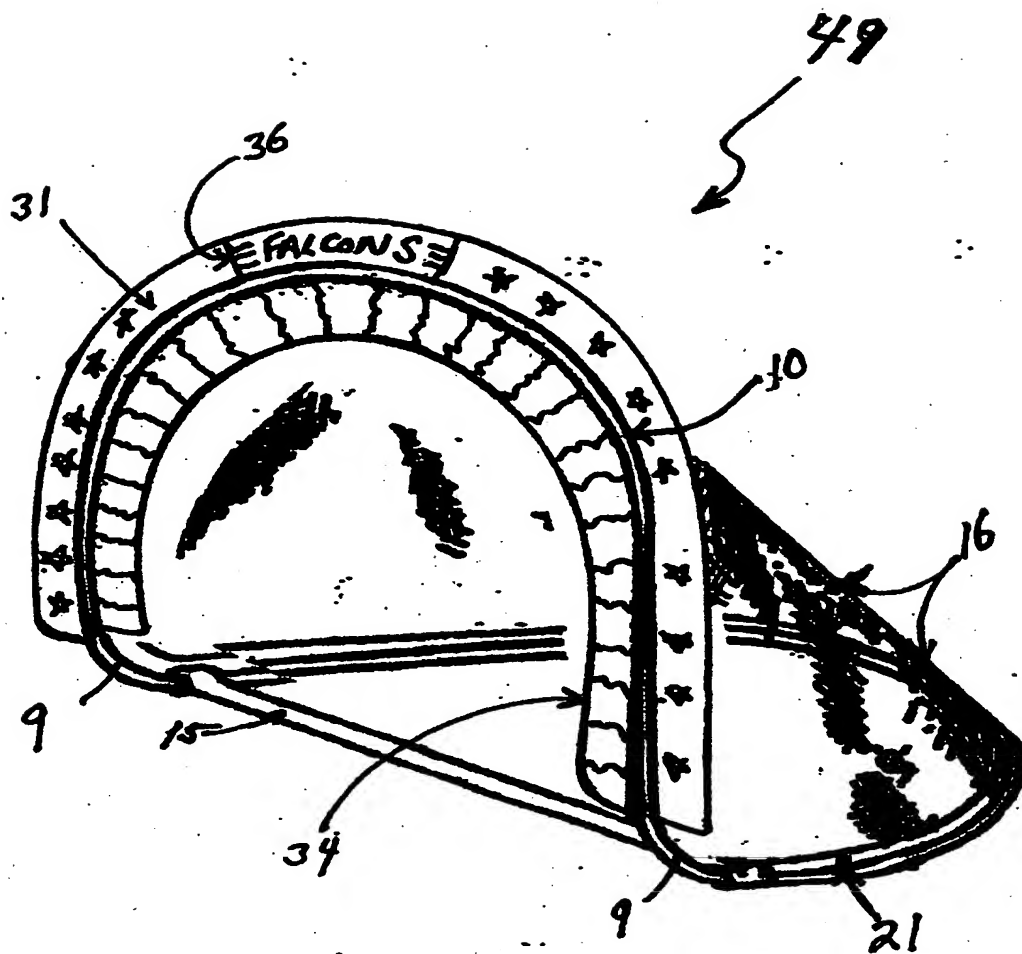


Fig. 106 (B)

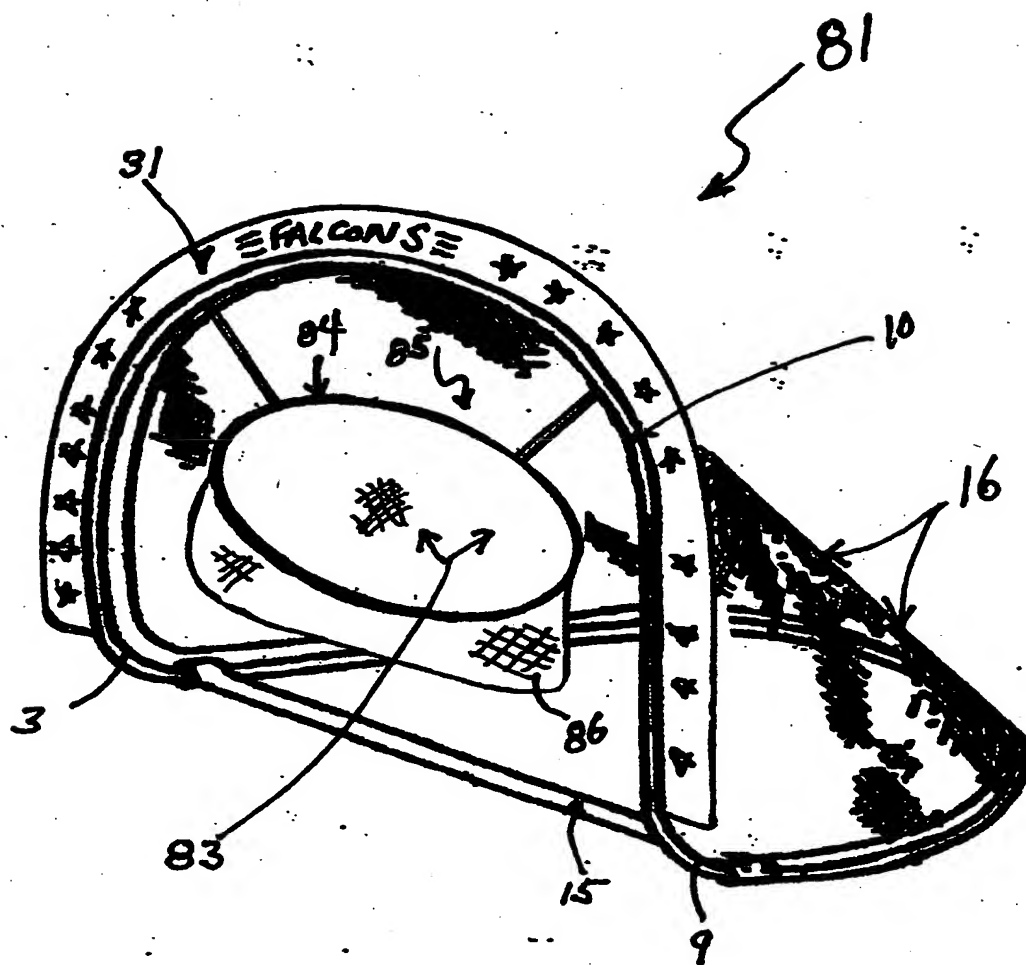


Fig. 107

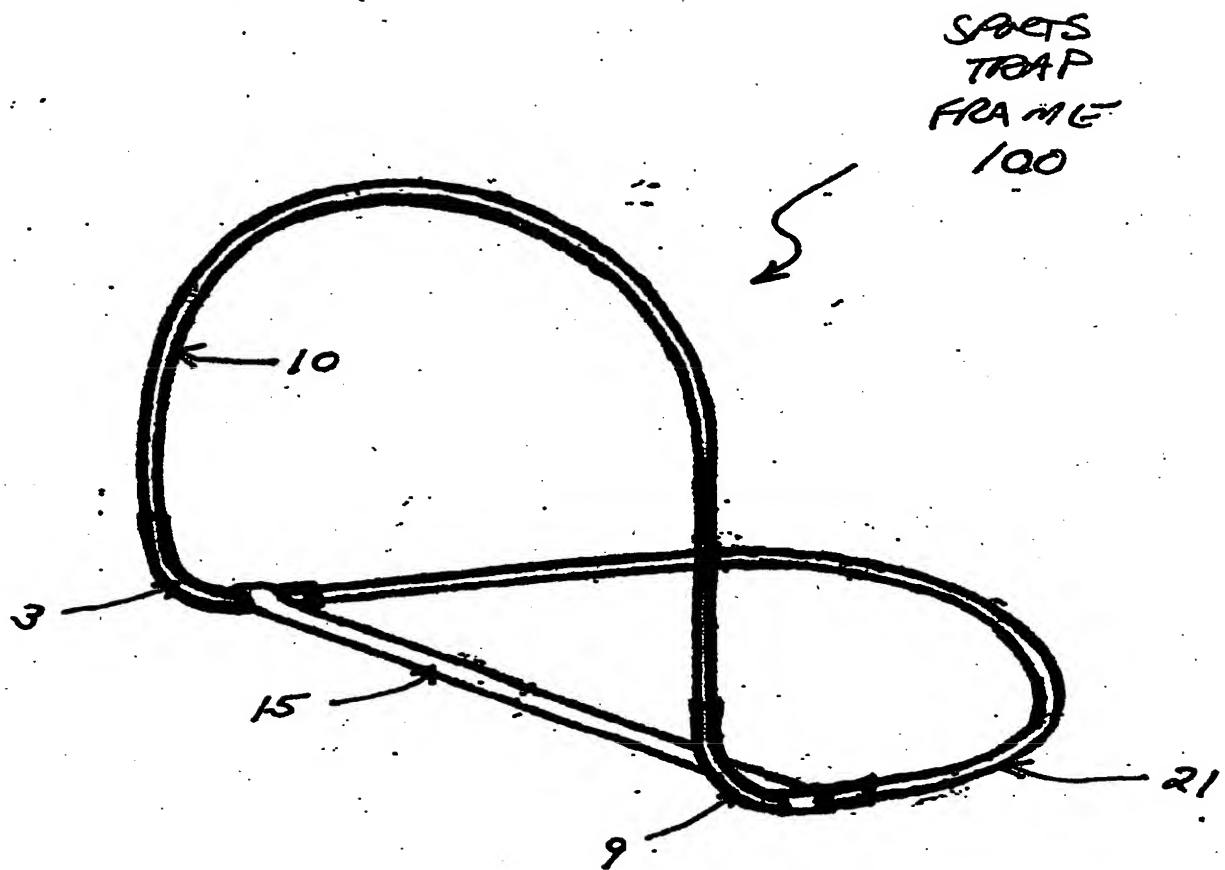


Fig. 110

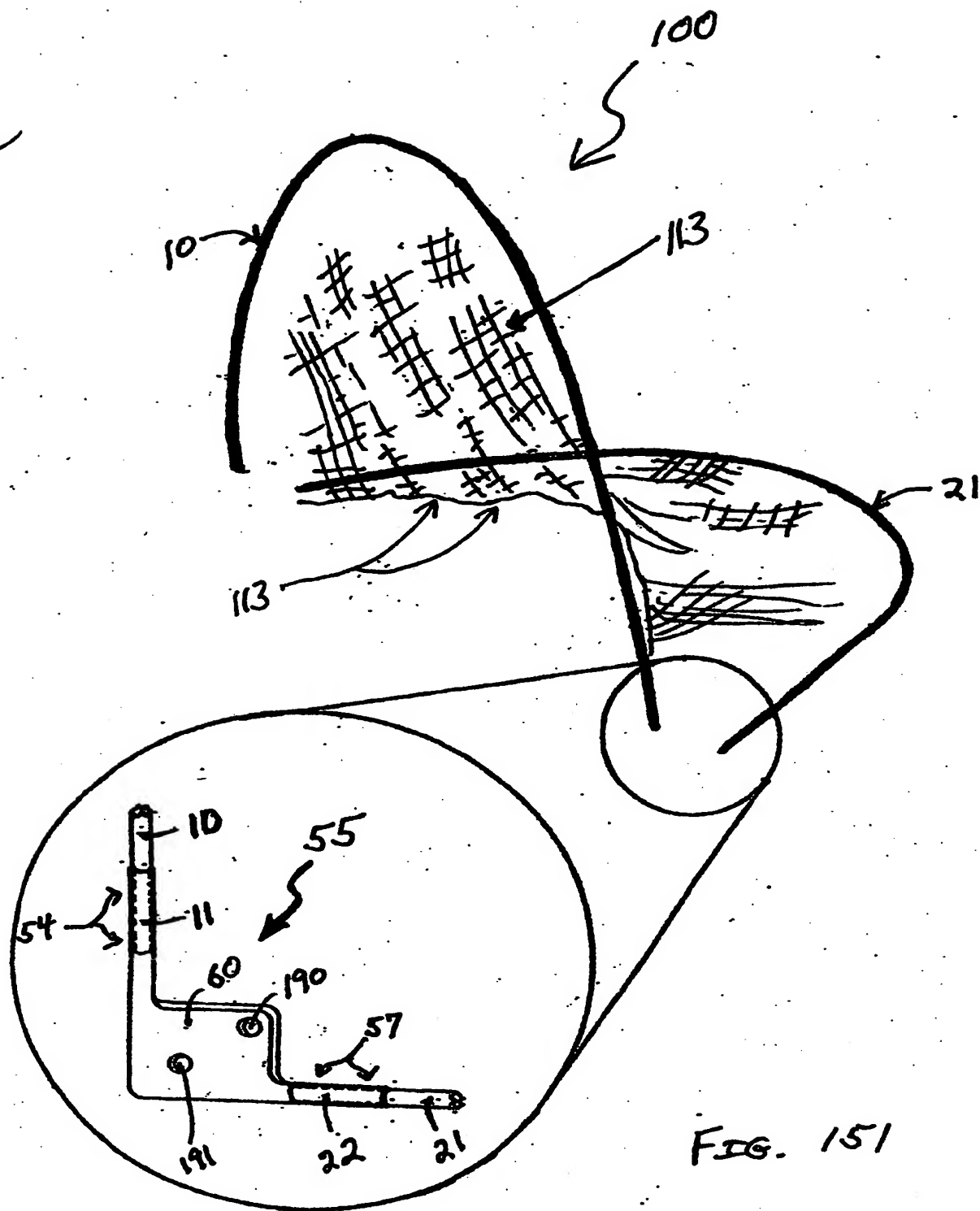


FIG. 151

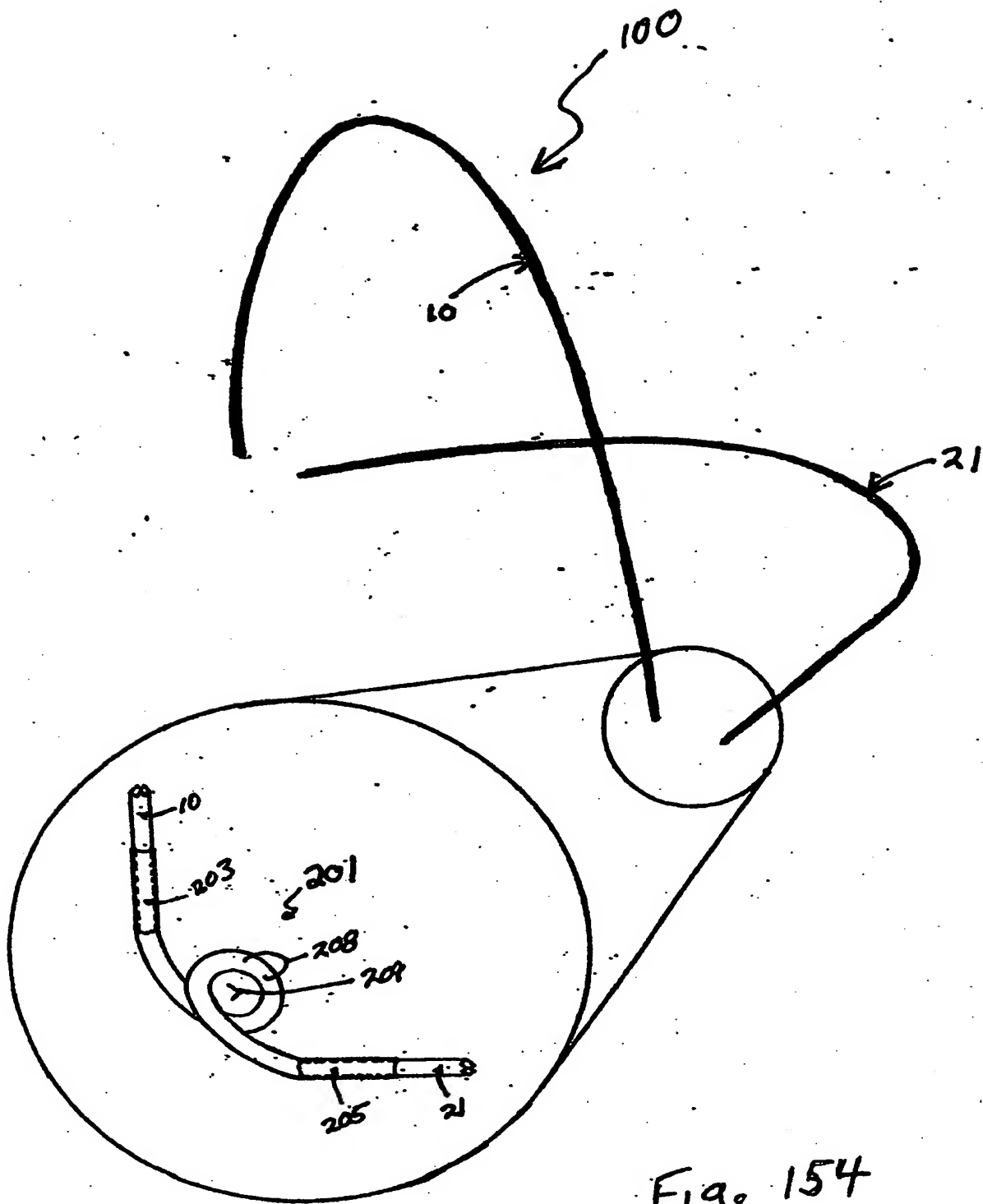


Fig. 154

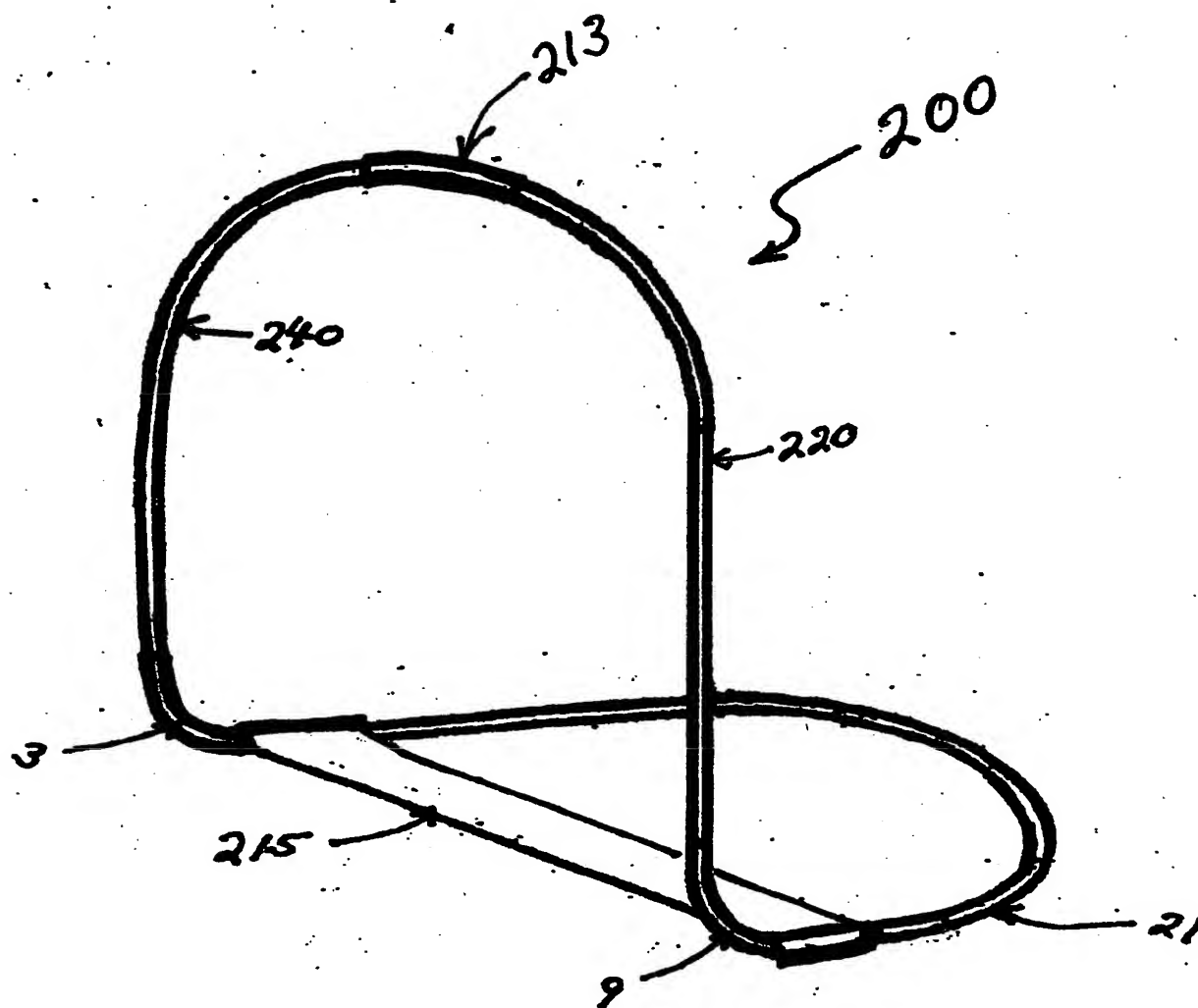


Fig. 160

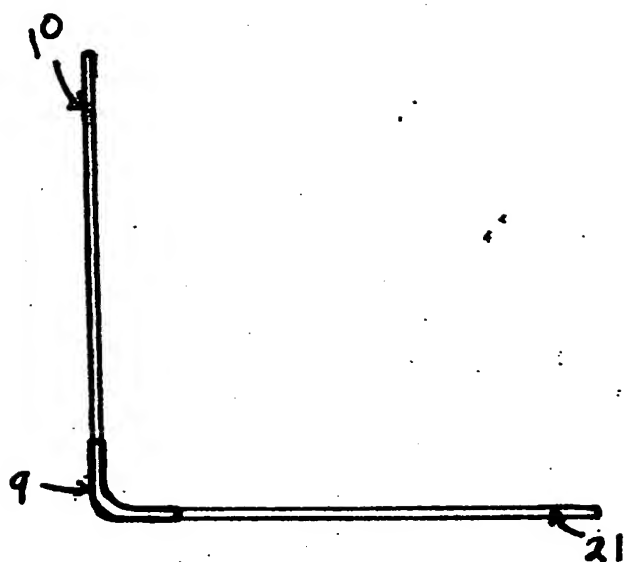


Fig. 181(a)

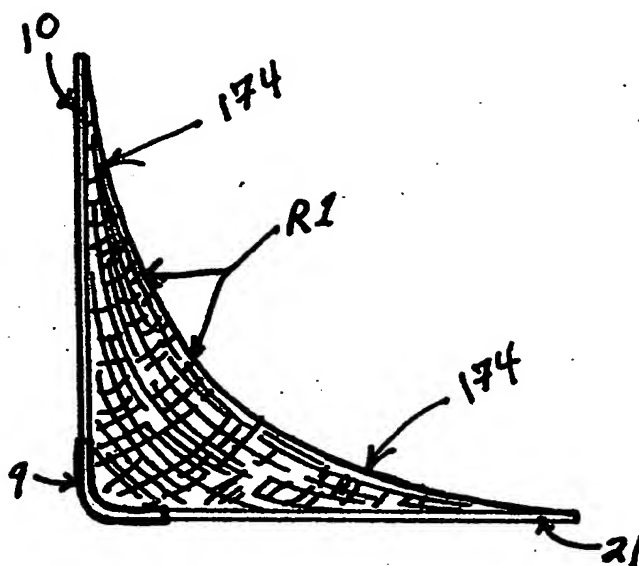


Fig. 181(b)

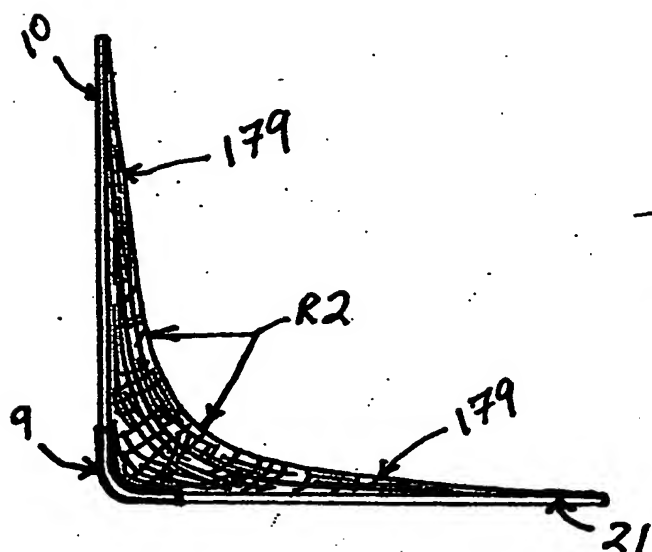


Fig. 181(c)

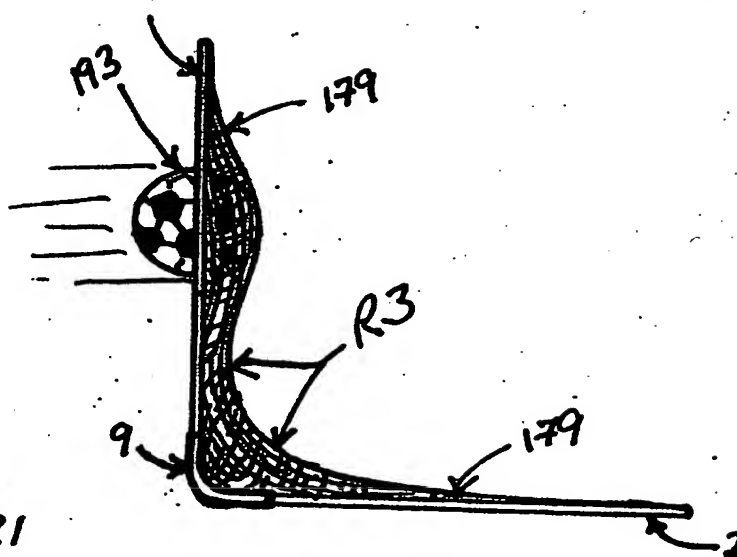
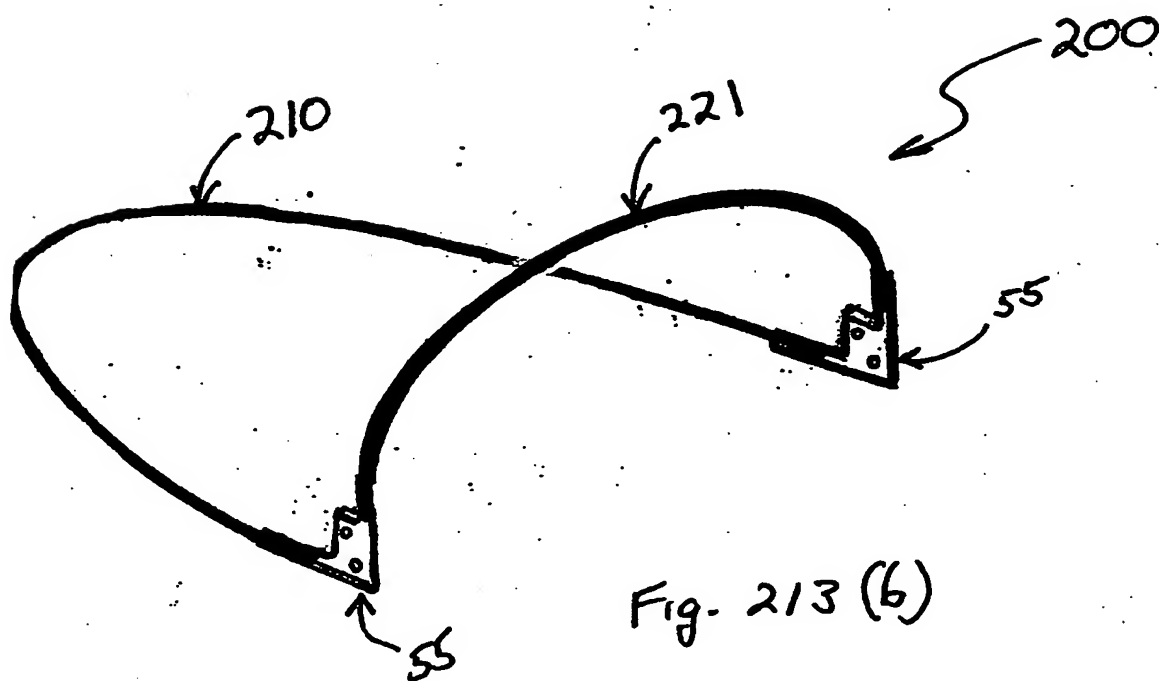
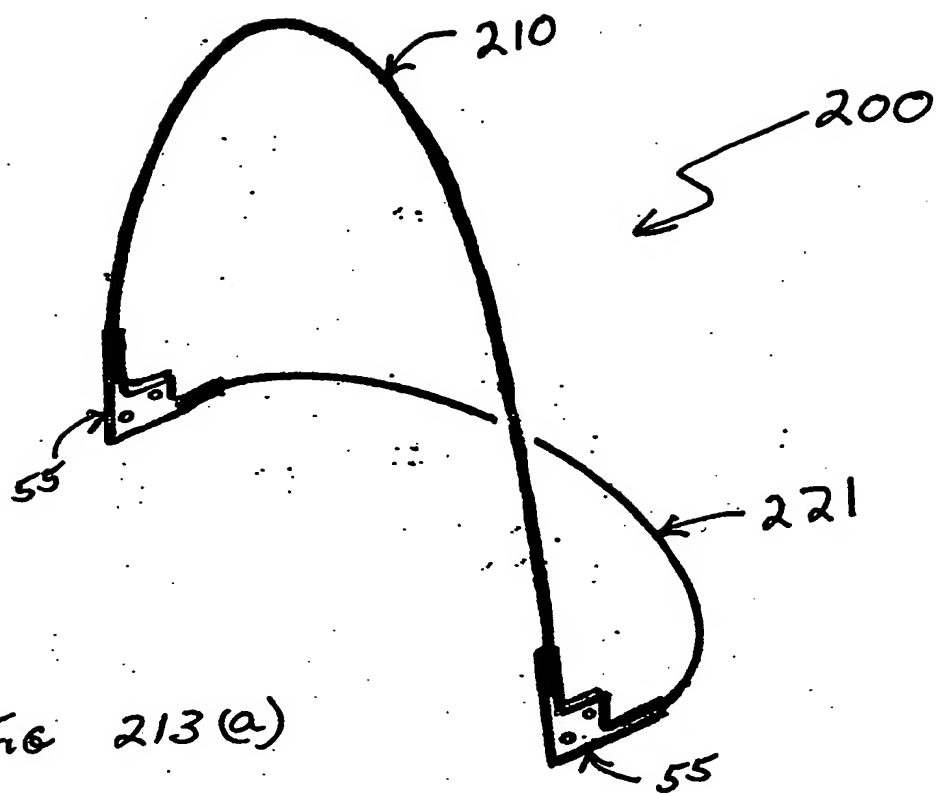


Fig. 181(d)



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